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**BRUCHIDAE INFESTING SEEDS OF COMPOSITAE, WITH DESCRIPTIONS OF NEW GENERA AND SPECIES (COLEOPTERA.)**

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For some thirty-two years a major task of our Department of Agriculture has been the exploration of all parts of the world for new plants adaptable to our agriculture. Up to the present time some ninety thousand lots of seeds and plants have been handled by the Office of Plant Introduction. This work has established the cultivation in this country of durum wheat and of the soybean, to mention two strikingly beneficial results. Nearly half of these lots consisted of seeds of which samples have been preserved in a seed collection in charge of H. C. Skeels. This seed collection now contains samples of seeds of more than twelve thousand species of plants and it is safe to say constitutes the greatest collection of seeds of economic plants in existence.

The infestation of these seeds by insects was early noted by the men in charge of this work and the insects noticed began to accumulate in the National Museum and in the Chittenden collection in the Bureau of Entomology (now in the Museum). After the establishment of the Federal Horticultural Board in 1912, all the material imported by the Office of Plant Introduction was subjected to rigorous inspection by the Port Quarantine Division of the Board and the insects intercepted sent by the Bureau of Entomology to the Museum for identification by the specialists of the Bureau.

On account of their agricultural importance, the legumes make up one-fourth of the seed collection and the Bruchidae which

infest seeds of this family have formed a large proportion of the insects intercepted. Some fifty museum drawers of these insects are now present in the Museum, many of them from material intercepted by the Federal Horticultural Board in seeds imported by the Office of Plant Introduction. Much of this material is accompanied by notes indicating the host seeds affected and is in many instances accompanied by the seeds from which they had emerged and constitutes the most important source of recorded but unpublished information on the habits of Bruchidae in existence. While a great majority of the Bruchidae of which the larval habits are known live in the seeds of legumes—Viciaceae, Cassiaceae, and Mimosaceae—many other plants are utilized. Whole genera of Bruchidae devote their attention to plants of other families. The palm bruchids have been the subject of a recent paper. In another, attention has been directed to the genus *Megacerus* with its species attached to plants of the family Convolvulaceae. In the Old World most of the species of *Spermophagus* use seeds of the same family; a few attack Malvaceae, while only a single species is known to affect the seeds of a legume—a species of *Cassia*. In the New World several species in different genera devote themselves to the Malvaceae. Besides these, material in the National Museum indicates the use of seeds of these plant families: Lauraceae, Rhamnaceae, Tiliaceae, Bixaceae, Epilobiaceae (Onagraceae), Anacardiaceae, and Dioscoriaceae. In Europe one of the bruchids lives as a larva in the stems of an Umbellifer. To these varied host plants we may now add the Compositae.

The only published indication that bruchid larvae can live in the seeds of composites which I have encountered is found in the description of *Bruchus lapsanae* Motschulsky 1874 Bull. Soc. Nat. Moscou 46<sup>2</sup>:235 where the species is said to be from "Panama in sem. [inibus] *Lapsanae*." Since the cichoriaceous genus *Lapsana* (sometimes written *Lampsana*) is native to the Palaearctic region with its described species ranging from Europe and the Mediterranean region to Japan, there must be some error of host plant or locality. Cichoriaceae seem to be almost absent from Central America. The description of this species, which has not since been recognized, shows that it is not similar to the other species here discussed.

H. Y. Gouldman, of the Federal Horticultural Board, found a pair (♀ and ♂) of a peculiar bruchid among the seeds of the tree *Dahlia* (*Dahlia maxonii* Safford) on March 23, 1920, in quarantine at Washington, D. C., collected by Wilson Popenoe at Antigua, Guatemala, on February 20, 1920 (S. P. I. 49757; F. H. B. 29942). These insects were examined by the writer in 1921 and were recognized as representing an undescribed genus of Bruchidae, but were not determined specifically. On March 16, 1923, Mr. Gouldman collected from seeds of the same host

plant a series of the same insect which the late Dr. E. A. Schwarz determined as *Bruchus longulus* Sharp 1885 (described from Nicaragua). These seeds were sent to the Office of Seed and Plant Introduction by W. Cameron Townsend from Chimaltenango, Guatemala (S. P. I. 56665; F. H. B. 345288). Recent examination of the seed of this sending preserved in the Seed Collection revealed an additional adult loose in the containing vial, another within a seed, a crushed pupa in a seed, and a number of the achenes showed emergence holes from which adults had escaped. These were not quite so neatly cut as is usual with Bruchidae, doubtless because of the fibrous nature of the covering of the seed. No trace of eggs could be found. We may then be sure that these seeds nourished the larvae from which the adult bruchids had developed. I have seen the types of *Bruchus longulus* and am convinced that Dr. Schwarz's determination is correct, but unfortunately the specific name is preoccupied in *Bruchus* and must be replaced. Dr. Sharp's figure of the species gives an impression of greater narrowing of the prothorax anteriorly than is really found.

A lot of seeds of an undetermined *Dahlia* resembling the horticultural *Dahlia*, from the Federal District of Mexico sent by William Brockway and received in Washington on September 22, 1913 (S. P. I. 36257) showed similar emergence holes in the achenes and indicate the presence of a *Dahlia* bruchid in that locality, but it still remains to be determined if it is the species described below or the Nicaraguan species or some other species still unknown.

There is in the United States National Museum a single male bruchid collected by Leopold Conradt in the Federal District of Mexico so closely related to the Nicaraguan *Dahlia* bruchid as to suggest that it may be the Mexican *Dahlia* bruchid but no accompanying notes are present to confirm this. It is congeneric with the Nicaraguan species and is described below.

Paul G. Russell of the Office of Foreign Plant Introduction collected a pair of a peculiar bruchid upon the flowers of *Cosmos* sp. at Oaxaca, Mexico, on September 29, 1930, which, from its affinity to the *Dahlia* bruchids, may be expected to breed in the seeds of the *Cosmos* upon which it was found. *Cosmos* belongs in the same tribe of the Asteraceae as *Dahlia*, *Coreopsis*, and *Bidens*. The seeds of the garden *Cosmos* seem to be too small and narrow to support a bruchid larva, but other species of possible horticultural value have seeds large enough to serve this use. This bruchid is closely allied to the other two here discussed, but differs so much in important characters as to make it desirable to place it in a genus distinct from them.

## DAHLIBRUCHUS, new genus.

Genotype *Dahlbruchus sharpianus* new name *Bruchus longulus* Sharp 1885, *Biologia Centrali Americana* Col. 5: 482, not Kraatz 1868.

Body elongate, about twice as long as broad and twice as broad as deep; head short, eyes emarginate more than one half, separated by the width of the eye or more, head strongly contracted beneath and on the sides but not above behind the eyes, temples abruptly declivous to the contraction; antennae short, compressed, perfoliate-clavate, joints 1-4 narrow, 5 and 6 gradually broader, 7-10 expanded, as broad as long or broader, 11 ovate; pronotum subquadrate with anterior angles rounded, dorsum little convex, surface even, median lobe slightly impressed medially, posterior angles a little acute, lateral margin acute, carinate posteriorly to the middle, ampliate in the middle, obsolete anteriorly, flanks broadly concave posteriorly; prosternum acute at apex, separating the coxae for about one half their length; mesepimeron lance-ovate, acuminate toward the coxa but remote from it; mesosternum oblique, narrow truncate at apex, overlapping the apex of the metasternum; scutellum small, subquadrate, emarginately bidentate at apex; elytra conjointly much longer than broad, nearly three times as long as the pronotum, slightly broader at base than the prothorax, gradually broader posteriorly to beyond the middle, surface even, without tubercles at base, not much convex (not at all longitudinally), striae fine, impressed, without visible punctures, free at apex, 5 and 6 abbreviate at apex, intervals flat, humeral callus and humeral lobe feeble, apices covering the pygidium at base; legs with all the femora somewhat incrassate; hind femur as wide as the coxa, nearly straight beneath, widest in the middle, lower side somewhat flattened, without carinae, teeth or denticles, condylar plates small and rounded, hind tibia straight except at base, gradually widened to apex, truncate at apex with apical teeth or spines, hind tarsus about as long as hind tibia, basitarsus about half as long, slightly arcuately arched, not produced at apex beneath, ungues appendiculate with the basal lobe a little acute, abdomen about as long as the thorax, longer than broad, first sternite behind the coxa longer than the coxal width and longer than sternite 2, but not as long as 2 and 3 together, intermediate sternites longer than usual, sternite 5 in ♂ very slightly broadly emarginate and longer in the middle than sternite 4, in the ♀ about as long as 3 and 4 together; pygidium subhorizontal, about as broad as long, broadly rounded at apex, subplane more convex and deflected at apex in the ♂.

I have seen no species of Bruchidae approaching in form the two species placed in *Dahlbruchus* excepting the species described below as *Cosmobruchus russelli*, which is still more elongate and more nearly cylindrical with the hind femur dentate beneath and hind tibia unarmed at apex. *Bruchidius longulus* Schilsky 1905 (*Kafer Europa's* 41: no. 79) described from France, Spain, Greece, and Asia Minor, must approach the species of this genus in form but has the hind femur with a fine denticle near apex beneath and the antennae serrate in the ♂ and subserrate in the ♀. Nothing is recorded as to the host-plant of this species.

The two species of *Dahlbruchus* may be distinguished thus:

Front finely carinate; sides of pronotum slightly convergent anteriorly; front tibiae ♂ with an erect acute tooth at middle beneath ♀ unknown

*conradti*, new species.

Front flat, without any indication of a carina; sides of pronotum not at all convergent; front tibiae unarmed in both sexes.

*sharpianus*, new name.

*Bruchus longulus* Sharp 1885.

***Dahlbruchus conradti*, new species.**

Black, antennal joints 1-4 (1 and 2 blackish above) and legs red, the hind femora suffused with black to about the middle; with appressed cinereous pubescence somewhat concealing the surface sculpture (much abraded in the type); pronotum somewhat longer than in *sharpianus* with moderate punctures separated by the width of one to three punctures, antennae longer than in *sharpianus*, third joint much longer than 2 or 4, 7-10 about as broad as long; front tibia with a strong acute erect tooth in the middle, and somewhat sinuately narrowed beyond the tooth; hind tibia with the apical armature made up of triangular teeth rather than spines (spiniform in *sharpianus*), the ventral tooth (mucro) not longer than the lateral tooth, pygidium less oblique and less convex than in *sharpianus* ♂, but suddenly bent down near apex. Length (apex of pronotum to apex of elytra) 2.5 mm.; width of elytra 1.25 mm.; depth .75 mm.

Described from a single ♂ type collected in the Federal District of Mexico by Leopold Conradt. The female is unknown.

**COSMOBRUCHUS, new genus.**

Genotype *Cosmobruchus russelli*, new species.

Closely related to *Dahlbruchus* and similar to it in many of its characters but still more elongate in form, nearly or quite three times as long as broad, subcylindrical instead of flattened, the depth being as great as the width instead of only half as great; elytra with striae 4 and 5 abbreviate at apex (instead of 5 and 6); hind femur with a strong flattened triangular tooth near apex beneath within, from which a fine carina extends forward for some distance; hind tibiae without apical teeth or spines; pygidium and hypopygium alike in the sexes, pygidium three-fourths as broad as long, abdomen longer than the thorax.

The species described below is the only known species.

***Cosmobruchus russelli*, new species.**

Black, antennal joints 1-5 and legs yellow-testaceous, femora blackish from base nearly to middle in ♀, beyond the middle in ♂; covered with appressed pubescence, white on the body beneath and but little concealing the surface but more condensed on the sides, above yellowish cinereous, somewhat conceal-

ing the sculpture; clypeus, front and neck rugosely and subconfluently punctured with punctures finer than those of pronotum, front subtectiform with a median longitudinal impunctate shining line; pronotum closely punctured with coarse shallow punctures often separated by less than the width of a puncture, intervals of elytra without punctures except for the usual microscopic punctulation of the surface in general; punctures of pygidium very shallow.

Length ♀ (apex of pronotum to apex of elytra) 2 mm.; width of elytra 1 mm.; depth 1 mm. Male about five-sixths as large.

Described from 1 ♀ type and 1 ♂ allotype collected by P. G. Russell, at Oaxaca, Oaxaca, Mexico, September 29, 1930, on the flowers of *Cosmos* sp.

The two genera here described belong in the subfamily Bruchinae, the largest complex within the family. Only a small number of genera in which they have differentiated are as yet distinguished. Their affinities are with American forms.

The form in these interesting species is with little doubt due to the shape of the achenes in which they pass their immature stages. The *Dahlia* achenes are flattened and elongate while those of *Cosmos* are nearly circular in cross section. I believe this principle governs the shape of many Bruchidae. Those species which are limited to hosts with flattened seeds tend to a flattened form while those which breed exclusively in seeds more nearly spherical assume a more compact form. Those not confined to seeds of the same form do not seem to be much affected by the shape of the host seed, but even here there is some reason to believe that some individuals are actually more depressed in form than others of the same species from pressure upon them during development.

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#### A NEW LEAF MINING BUPRESTID FROM THE CANAL ZONE (COLEOPTERA).

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##### *Pachyschelus psychotriæ*, new species.

*Male*.—Broadly ovate, slightly longer than wide, more strongly narrowed behind than in front, strongly shining, sparsely pubescent, the pubescence forming more or less distinct fasciæ on the elytra; head and pronotum aureo-aneous; scutellum piceous, with a feeble violaceous tinge in certain lights; elytra cyaneous, with a distinct violaceous tinge; beneath piceous, except the tarsal lamellæ, which are brownish white.

Head strongly convex, with a distinct, narrow, longitudinal groove on the front; surface finely, densely granulose, with a few coarse, irregularly distributed punctures intermixed, and sparsely clothed on the occiput with short, inconspicuous hairs.